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ABSTRACT

This research study is a continuation of the work on Instructional Flexibility Training (IFT) developed by Joyce and Hodges. It attempts to discover if the use of IFT helped student teachers control the flexibility of their teaching styles, whether they could employ a variety of teaching models, and whether the conceptual ability of the teacher affected his flexibility. Two hypotheses were formulated: (1) that IFT will give teachers greater controlled flexibility and (2) that student teachers with a high conceptual level will have greater controlled flexibility than those with a lower conceptual level. The study used 54 teachers in experimental and control groups, with conceptual levels determined by a Sentence Completion Test. Both groups taught a Controlled Flexibility Lesson near the beginning and end of their assignments, with the experimental group receiving IFT in the interval. Measurement of the initial styles showed no significant differences, and the final analysis showed that the experimental group did not differ significantly from the control group in controlled flexibility. All subjects in both groups were at the lower end of the concreteness-abstractedness spectrum, preventing a true test of the second hypothesis. The implication of the study is that IFT may be useful in helping prospective teachers learn more abstract teaching strategies, but further research is needed. (MBM)

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THE EFFECT OF INSTRUCTIONAL FLEXIBILITY TRAINING ON THE FLEXIBILITY OF STUDENT TEACHERS' TEACHING STYLES

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Purpose of the Study

The purposes of this study were to determine the effect of Instructional Flexibility Training on the controlled flexibility of student teachers' teaching styles and to determine the relationship, if any, between conceptual level and controlled flexibility of teaching styles.

Background of the Study

Instructional Flexibility Training (IFT) is a systematic procedure developed by Joyce and Hodges[1] to analyze and change the verbal teaching behavior of prospective teachers in training, helping them to develop flexibility of teaching style by enlarging their repertoire of teaching maneuvers. This training model has its genesis in the Conceptual Systems Theory of Harvey, Hunt, and Schroder[2] and is based on the following assumptions:

1. A learner's response to, and consequent learning from, different teaching strategies or training environments will vary with relation to his conceptual level.
2. Prospective and practicing teachers can learn to discriminate between, analyze, and describe their own teaching behaviors.
3. Teachers can increase the number of teaching strategies in their repertoire through experimentation, feedback, and analysis.
4. Teachers can integrate these different teaching strategies into their teaching behavior so that they can shift easily from one strategy to another, thereby adapting the training environments to match and enhance the conceptual development of the learner.

The conceptual Systems Theory is based on the assumption that,

> . . . an individual interacts with his environment by breaking it down and organizing it into meaningful patterns congruent with his own needs and psychological make-up. As a result of this interchange, perceptual and behavioral constancies develop, which stem from the individual's standardized evaluative predilections (concepts) toward differentiated aspects of his external world. (these concepts serve as the) . . . modes of relatedness or connecting ties between the individual and his environment . . . A concept is a system of ordering that serves as the mediating linkage between the input side (stimuli) and the output side (response), 3/

Schroder, Driver and Streufert 4/ refer to this adaptive procedure as an "information processing system" which consists of "content" variables (situational factors or "what" a person thinks) and "structural variables" (disposition factors or "how" he thinks). It is the structural variable that is the basic concern of the Conceptual Systems Theory,

> . . . measuring the way a person combines information perceived from the outside world, as well as internally generated information, for adaptive purposes . . . "how" an individual relates to objects through modes of subject-object connectedness that are presumably independent of the content or nature of the object. 5/

Harvey, Hunt and Schroder assume that "the most important structural characteristic is the degree of concreteness or abstractness." 6/ Developmentally, individuals will progress to varying degrees along a concrete-abstract dimension. The greater one's abstractness, the greater is his ability to transcent the immediate and to move more into the remote, and the more capable he is of abstracting relationships from objects of his experience and of organizing them in terms of their interrelatedness. In contrast, the greater one's concreteness the greater the degree of

stimulus "oughtness" in his responses. The multiplicity and interrelatedness of his conceptual parts gives the abstractly functioning person more alternatives, or degrees of freedom, than the concretely functioning individual. Because no subject-object linkage is as central to the person with the high integrative structure or the high conceptual level, he adapts more easily as complex changes occur in the environment.

In more concrete functioning response to activating stimuli is more fixed, governed by rules, absolutism, rigid categorization, external causality, little tolerance for ambiguity, fixed role relationships, and inflexibility. A person with such a dearth of cognitive flexibility operates at a low conceptual level. Higher conceptual level is characterized by more freedom, more tolerance for stress and ambiguity, more flexibility, more potential creativity, and more ways to relate to people and objects as well as generate new aspects of relating.

Hunt, utilizing this framework, has developed a Conceptual Systems Change Model which demonstrates the process of personality development from the very concrete to the most abstract structure, and has applied it to education.[7/] This differential treatment model provides for the establishment of long term goals in education, i.e. to encourage development of adaptive capacity and flexibility; specifies short term goals or stages the learner must achieve while progressing toward the ultimate objectives; and based on measured conceptual level, indicates those educational environments most likely to produce conditions in which the learner will attain those goals.

Stepping from the Conceptual Systems change model, Hunt has devised a model which provides a framework for analyzing the training of training agents, i.e. teachers, psychotherapists, social workers, etc., in which he analyzes how training agents learn to "radiate environments."[8] A teacher radiates an environment through the way a lesson is presented or the way he interacts with his students. (Presumably, the more teaching strategies he has at his command, the more effective he is.) The goal of such analysis is to enhance training agent effectiveness.

> Agent effectiveness is presently defined as the capacity to radiate a wide variety of environments, to select from this variety a specific environment to be radiated toward a particular person or group with the aim of producing a particular behavioral outcome and to shift from one environment to another under appropriate circumstances . . .
>
> Agent effectiveness therefore includes both his "ability" to radiate specific environments and his "understanding" of when to utilize a specific environment or shift to another.[9]

To accomplish training agent effectiveness the model contains a hierarchy of three skills--skill in discriminating between environments, i.e. structured, reflective, supportive, etc., skill in radiating environments, and skill in flexible modulation from one environment to another. IFT is a system designed to help prospective teachers accomplish the three skills in the Hunt model, thereby, hopefully increasing their effectiveness. To teach the trainees to be able to discriminate between environments, a coding system[10] developed by Joyce for classifying teacher verbal behavior is used. The behavioral categories and subcategories are derived from the Conceptual Systems view of relevant

environmental dimensions. This coding system enables the trainee to learn to analyze his teaching behavior and that of others from different frames of reference, i.e. social climate, content, teaching strategies, etc. Using audio and/or video tape feedback the trainee learns to discriminate among his own teaching behaviors.

To develop his skill in radiating an increased number of environments, he is helped to plan realistic goals, to use and follow appropriate teaching models radiating distinctive environments, and through feedback to analyze his progress toward those goals. Using this system Joyce and Hodges found that trainees could successfully adapt their behavior, teaching separate lessons built on different teaching models requiring considerable flexibility in style.[11/] They recommended that further research be conducted prescribing models requiring flexibility of teaching style within one lesson and that the IFT model be evaluated using experimental and control groups. Hunt and Joyce both maintain that for teaching purposes such direct intervention is necessary if a teacher trainee is to build a flexible repertoire of teaching maneuvers.

To develop skill in flexible modulation of one environment to another at appropriate times within a lesson Hunt suggests that the trainee should be provided with some theory, such as the Conceptual Systems change model, which deals with how these behaviors are organized and combined into a system of continuous development.[12/] Joyce defines flexibility in teaching as behavioral adaption through sensitivity to what the learner is thinking and doing and stresses that there is a

need to find ways of studying such sensitivity and consequent flexibility within lessons.[13] Hunt has developed a simulation technique for determining the sensitivity of a teacher trainee to a learner and the trainee's ability to modify his behavior accordingly.[14]

Hunt and Joyce conducted two studies to determine if initial teaching styles exhibited by teacher trainees were related to their personalities (conceptual levels). Although their sample was small, they found a direct relationship--the lower his conceptual level, the more directive he is; the higher his conceptual level, the more likely he is to radiate a reflective environment.[15] Joyce and Hodges, however, studying developmental teaching styles of elementary teacher trainees were not able to conclude that differences in conceptual level significantly affected variability of teaching style, but recommended further research using larger numbers of subjects.[16]

Building on this previous research the present experimental study was conducted as a next step in the use of IFT in the training of prospective teachers. If attempted to answer the following questions:

Does the use of IFT aid a prospective teacher to obtain more control of his flexibility of teaching style?

Can prospective teachers manifest a variety of teaching models, thereby radiating a number of different educational environments?

Are prospective teachers who function at a higher conceptual level more able to control their flexibility of teaching style than those who operate a lower conceptual level?

From these questions the following two hypotheses were formulated:

1. Student teachers who receive IFT will manifest greater controlled flexibility in their teaching styles than student teachers who do not receive IFT.
2. Student teachers who function at a higher conceptual level will manifest greater controlled flexibility in their teaching styles than student teachers who function at a lower conceptual level.

The Design of the Study

The study was designed to test the effectiveness of Instructional Flexibility Training on the controlled flexibility of teaching styles of prospective teachers. Fifty-four subjects were placed in experimental and control groups. The Sentence Completion Test[17/] was given to all subjects to determine and control for conceptual level. The initial teaching style variable was controlled by measuring the initial teaching style of subjects in both groups. The experimental group was given orientation in Instructional Flexibility Training including instruction in the use of the Manual for Analyzing the Oral Communications of Teachers.[18/] Both groups were required to teach an Initial Controlled Flexibility Lesson (Lesson 1) consisting of three different teaching-maneuver models near the beginning of the student teaching assignment and a Final Controlled Flexibility Lesson (Lesson 2) consisting of three teaching models near the end of the assignment. Between Lesson 1

and Lesson 2 the experimental group received Instructional Flexibility Training and the control group was taught in the conventional manner. Controlled flexibility of style differs from flexibility of style as defined by Joyce and Harootunian. Controlled flexibility is a consciously preplanned move to radiate a specific environment required by the teaching behavioral models outlined in the Initial and Final Controlled Flexibility Lesson structures. The term flexibility includes the above definition but also encompasses those spontaneous teacher reactive-adaptive behaviors manifested to cope with pupil needs, interests, and levels. Controlled flexibility is one type of direct intervention advocated by both Hunt and Joyce to enhance overall flexibility of teaching style.

Data Sources and Treatment

Two controlled flexibility lessons were created to test the subjects' capabilities to shift their teaching styles within the lessons. Each lesson was divided into three phases, each phase requiring the subject to exercize a different theoretically based teaching model. Because the purpose of IFT is to help teachers enlarge their repertoire of teaching behaviors, the phases were designed to use behaviors both manifested and not manifested in the trainees initial teaching styles. This made it necessary for each subject to consciously change or "flex" his teaching style (controlled flexibility) twice within each lesson, i.e. to shift from one teaching maneuver (model) to another, manifesting three distinct teaching behaviors. See Figure 1.

FIGURE 1

INITIAL CONTROLLED FLEXIBILITY LESSON (Lesson 1)

Phase 1	Phase 2	Phase 3
Direct Informational-Authoritative Procedural Model	Reflective Creative-Expressive Model	Cooperative Procedural Model
(I3 I4 I5 P3 P4)*	(I2)	(P1 P2)

FINAL CONTROLLED FLEXIBILITY LESSON (Lesson 2)

Phase 1	Phase 2	Phase 3
Cooperative Procedural Model	Direct Informational-Authoritative Procedural Model	Reflective Inductive Thinking Model
(P1 P2)	(I3 I4 I5 P3 P4)	(I1)

To determine whether the data supported or did not support the first hypothesis the verbal behavior of each subject during each lesson was coded in accordance with the Manual for Analyzing the Oral Communications of Teachers. Inter coder reliability was .88 for Lesson 1 and .84 for Lesson 2. To determine if each subject "flexed" or shifted his teaching style twice in each lesson as prescribed by the three teaching models, it was necessary to make clinical judgements. To aid in this analysis a teaching style shift scale was devised. See Figure 2.

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*Codes (I3, etc.) refer to categories of verbal behavior designated on the coding grid of the Manual for Analyzing the Oral Communications of Teachers. See Appendix A.

FIGURE 2

TEACHING STYLE SHIFT SCALE

Degree of Shift	Description	Clinical Score
No Shift	No shift is apparent. Subject does not change his style or shift into next phase of lesson. Categories and subcategories of verbal behavior used by the subject do not appear to change.	1
Low Shift	Some shift is noticed, but very difficult to discern. Very little apparent change in categories or subcategories of verbal behavior used by the subject.	2
Low Normal Shift	Some shift noticed, but subject has difficulty in effecting the shift. Apparently requires many communications to make the shift.	3
Normal Shift	Shift from one phase of lesson to the next is accomplished with little difficulty. Average change of style to next phase. Natural apparent change in categories or subcategories of teacher verbal behavior.	4
High Normal Shift	Shift from one phase of lesson to the next is accomplished with ease. Transition to next phase of lesson is very obvious. Apparent change of categories or subcategories is very noticeable.	5
High Shift	Shift from one phase of lesson to next is dramatic. Transition is very apparent and intriguing. Change of categories or subcategories is unmistakable.	6

This scale enabled the coders to make two clinical judgments--a determination of whether or not the subject shifted as required; and, if he did, to what degree he shifted (how apparent was the shift?). For example, if in the judgment of the coder, a subject did not shift his style, a clinical rating of "1" was assigned. If he experienced great difficulty in shifting, that shift was scored with a mark of "2." A normal transition was rated as "4" and an enthusiastic or a decided shift was scored as "5." The judgment was based on not only the content of what the subject said, but also, in the opinion of the coder, on the subject's intent, his voice, inflection, and his apparent enthusiasm or lack of it. Inter coder reliability for placement of shifts in Lessons 1 and 2 was .83 and .92 respectively, and reliability for degree of shift in Lessons 1 and2 was .85 and .82.

Each of three phases of each lesson was then analyzed to determine if and to what extent the required teaching model had been manifested. To do this the degree or percentage of each subject's behavior that was performed in the required subcategories was calculated. Percentage indices were established for each teaching model by dividing the behavioral frequency or frequencies manifested in the required subcategory or subcategories by the total behavioral frequency or frequencies manifested within the relevant categroy or categories. See Figure 3. These behavioral percentages (the extent to which the teaching models were followed) were then analyzed and compared. Percentage index differences between phases were then calculated to determine the degrees of teaching style shifts or the extent to which the subjects exercised controlled

FIGURE 3

Teaching Model	Percentage Index Designation	Teaching Behavior Ratios
Supportive	A	$\frac{S+}{\text{Total } S}$
Reflective-Inductive Thinking	B	$\frac{I1}{\text{Total } I}$
Reflective-Creative Expressive	C	$\frac{I2}{\text{Total } I}$
Indirect Informational	D	$\frac{I1 + I2}{\text{Total } I}$
Direct Informational	E	$\frac{I3 + I4 + I5}{\text{Total } I}$
Cooperative Procedural	F	$\frac{P1 + P2}{\text{Total } P}$
Authoritative Procedural	G	$\frac{P3 + P4}{\text{Total } P}$
Direct Informational-Authoritative Procedural	H	$\frac{I3 + I4 + I5 + P3 + P4}{\text{Total } I + \text{Total } P}$

flexibility. In this way it could be determined whether a subject could control his teaching style flexibility, i.e. whether he did or did not shift his teaching style from one maneuver to another, and if so, to what degree.

Results of the Study

Measurement of the initial (preferred) teaching styles of the experimental and control groups indicated no significant differences. Both groups were predominantly direct and authoritative, but demonstrated some tendencies toward indirect behavior. Neither indicated ability to radiate an inductive thinking environment (I1) or allowed children to develop standards (P1). The control group was slightly more supportive and indirect.

Figure 4 shows the total verbal behavioral frequencies for each group in each category, subcategory, and combination of subcategories required by the teaching models in each lesson. Frequencies for sanctioning, behavior and for talk used to maintain the social system, as well as total communications by phase and lesson, are also shown.

The frequencies in Figure 4 indicate that the experimental group talked more, utilized more positive and less negative sanctioning, and used more indirect communications. Both groups were considerably more direct than indirect, but reduced their direct behavior as well as their sanctioning and talk to maintain the social system. As reflected in initial teaching styles, each group experienced difficulty in establishing environments that were conducive to developing cooperative standards and reflective-inductive thinking.

Figure 4

VERBAL BEHAVIOR FREQUENCY DISTRIBUTION BY CATEGORY AND SUBCATEGORY REQUIRED BY TEACHING MODELS IN EACH LESSON FOR EACH GROUP

Experimental - Lesson 1

	S+	S-	I2	I1 I2	I3 I4 I5	P1	P1 P2	P3 P4	I3,4,5 P3,4	M	Total
Ph1			47	50	461	1	32	275	736	116	1000
2			716	779	1298	3	47	580	1878	485	3574
3			74	77	548	5	381	623	1171	353	2266
Total	577	158	837	906	2307	9	460	1478	3785	954	6840

Experimental - Lesson 2

	S+	S-	I1	I1 I2	I3 I4 I5	P1	P1 P2	P3 P4	I3,4,5 P3,4	M	Total
Ph1			21	96	542	57	383	518	1060	203	1926
2			1	40	321	2	29	139	460	49	629
3			161	522	952	9	134	760	1712	429	3114
Total	381	171	183	658	1815	68	546	1417	3233	681	5669

Control - Lesson 1

Ph1			39	40	463	0	10	261	724	139	996
2			518	570	1085	0	43	753	1838	578	3385
3			88	96	349	1	225	473	822	274	1584
Total	329	277	645	706	1897	1	278	1487	3384	991	5965

Control - Lesson 2

Ph1			5	35	249	41	284	373	622	211	1236
2			19	79	331	0	32	221	552	104	814
3			157	575	912	2	[illegible]	681	1593	340	2888
Total	275	175	181	689	1492	43	377	1275	2767	655	4938

In shift one of lesson one the prescription was to decrease direct informational-authoritative procedural environment (H) and initiate reflective-creative expressive and indirect informational behaviors (C and D). In the second shift these latter behaviors were to be decreased and a cooperative procedural environment (F) exercised. The first shift in lesson two required that cooperative procedural behavior (F) be discontinued and flexed into a direct informational-authoritative procedural environment (H). In shift two that environment was to be changed into reflective-inductive thinking and indirect informational behaviors (B and D).

The total number of subjects in each group who were able and not able to shift from radiating one environment to another, manifesting the teaching model prescribed in each phase of each lesson, is shown in Table I. Because a shift included modification of two or more behaviors, a comparison of clinical judgment shift score with appropriate percentage index measurements necessitated the comparing of that score with at least two and sometimes three percentage index differences. For example, in Table I for the experimental group in lesson one, shift one, although a total of six "no" and "negative" shifts are indicated, only three subjects requiring three clinical judgments are represented.

Subjects in the experimental group generally shifted as prescribed in both lessons except for flexing into the reflective-inductive thinking model (B) in the second shift of lesson two where six subjects had difficulty. The control group experienced considerable trouble in the second

TABLE I

TOTAL SUBJECTS IN EXPERIMENTAL AND CONTROL GROUPS ABLE AND NOT ABLE TO SHIFT AS PRESCRIBED IN LESSONS ONE AND TWO AS INDICATED BY PERCENTAGE INDEX DIFFERENCES

	LESSON I						LESSON II				
	Able to Shift										
Index	B-	C+	D+	C-	D-	F+	F-	H+	H-	B+	D+
Shift	1	1	1	2	2	2	1	1	2	2	2
Exp	26	26	26	25	26	25	24	24	25	22	24
Con	23	24	24	16	16	12	25	24	23	22	23
	Not Able to Shift										
Exp											
-	1[b]	1[c]	1[c]	3[d]	1[d]	3[e]	1[f]	1[f]			1
O					1[d]					3	
N	1[a]	1[a]	1[a]				3[g]	3[g]	3[g]	3[g]	3[g]
Con											
-	2[b]	1[c]	1[c]	3[h]	3[h]	3[h]		2	3[d]	2[d]	3[d]
O						4	1			2	
N	1[a]	1[a]	1[a]	7[a]	7[a]	7[a]					

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a through g like letters indicate same subjects by group

h = 1 subject the same, two subjects different.

- = percentage change in wrong direction.
O = No percentage change.
N = No shift.

shift of lesson one when ten subjects failed to shift out of an indirect informational model and fourteen subjects could not flex into a cooperative procedural environment. Control group shift performance was improved in lesson two.

The clinical judgments made are indicated by subject for each lesson and shift as clinical judgement scores in Appendix B. A comparison of clinical shift scores with actual behavior as measured by the appropriate percentage index difference means was completed using the F test. See Table II. Agreement of the clinical judgments and the percentage index difference means were statistically significant at the .01 level for percentage indices H and F in lesson one and at the .05 and .01 levels respectively for indices F and H in shift one of lesson two. Comparisons for other indices B, C and D (all reflective or indirect) did not approach statistical significance. This could be explained by the fact that the clinical ratings assigned by the coders were made while coding the lessons and were based on the coder's judgment of the subject's intent, his voice inflection, and his apparent enthusiasm or lack of it. Often after what appeared to the coder to be a herculian attempt to shift his style, a subject would or could not follow through with the prescribed verbal behavior. Another possible reason could be that because the subjects preferred style was more direct than indirect, radiating the reflective environments was more difficult for them, thereby reducing the expected range of indirect verbal behavior.

TABLE II

COMPARISON AND ANALYSIS OF VARIANCE OF CLINICAL JUDGMENT SCORES TO PERCENTAGE INDEX DIFFERENCE MEANS FOR SHIFTS FOR FIFTY-FOUR SUBJECTS

	Clinical Judgment Score 1	2	3	4	5	F Ratio
Lesson 1 Shift 1						
Index H-	43.54	-13.34	-23.62	-24.40	-28.41	7.686*
C+	7.59	36.29	31.02	30.86	35.57	.891
D+	7.59	36.29	35.47	33.08	37.72	1.055
Numbers of Subjects	2	3	14	29	6	
Lesson 1 Shift 2						
Index C-	-30.68	-17.18	-34.46	-27.86	-16.37	.809
D-	-34.48	-21.58	-36.23	-29.63	-16.80	.805
F+	- 0.83	.68	22.56	30.91	36.01	4.849*
Numbers of Subjects	7	5	10	28	4	
Lesson 2 Shift 1						
Index F-	-70.26	-40.53	-30.24	-35.10	-45.44	3.093*
H+	-37.14	24.67	19.31	25.97	29.70	11.006*
Numbers of Subjects	3	7	9	26	9	
Lesson 2 Shift 2						
Index H-	0.00	-11.83	-20.96	-21.13	-25.05	1.029
B+	0.00	9.35	8.64	8.96	13.23	.377
D+	0.00	29.19	31.18	30.87	34.23	.944
Numbers of Subjects	2	9	14	24	5	

*Critical F with 4 and 49 df = $\pm$ 2.560 for significance at the .05 level and $\pm$ 3.730 for significance at the .01 level for a one-tailed test.

Figure 5 displays the percentage index means for those teaching maneuvers required for each phase of each lesson by the experimental and control groups. To display the shift in required behaviors the phase immediately preceding and/or following the phase where the behavior was required has been included. For example, the percentage index C mean for phases one, two and three of lesson one is shown although the reflective creative-expressive model (C), was required only in phase two. Inspection shows the predominance of direct informational-authoritative procedural behavior (H) demonstrated in both lessons by both groups. The inability of each group to substantially reduce this direct-authoritative behavior when a shift was to be made is shown. In contrast, the shifts in indirect behavior (D), including the reflective-creative expressive and the cooperative-procedural models (C and F) though manifested to a lesser degree, were relatively more pronounced. Both groups encountered difficulty in radiating a reflective-inductive thinking environment (B), but the almost complete absence of this behavior in the experimental group during the phase immediately preceding the phase in which it was required, and the subsequent "flexing" to this required behavior, appears to indicate that the experimental group was beginning to make a conscious effort to manifest this normally little used teaching behavior.

Percentage index difference means, standard deviations, and range distributions for each shift of each lesson for the experimental and control groups are shown in Figure 6. In comparing the percentage index difference means of the experimental group and the control group on like

Figure 5

Percentage Index Means for Phases 1, 2, & 3 of Lessons 1 & 2
For Experimental Control Groups

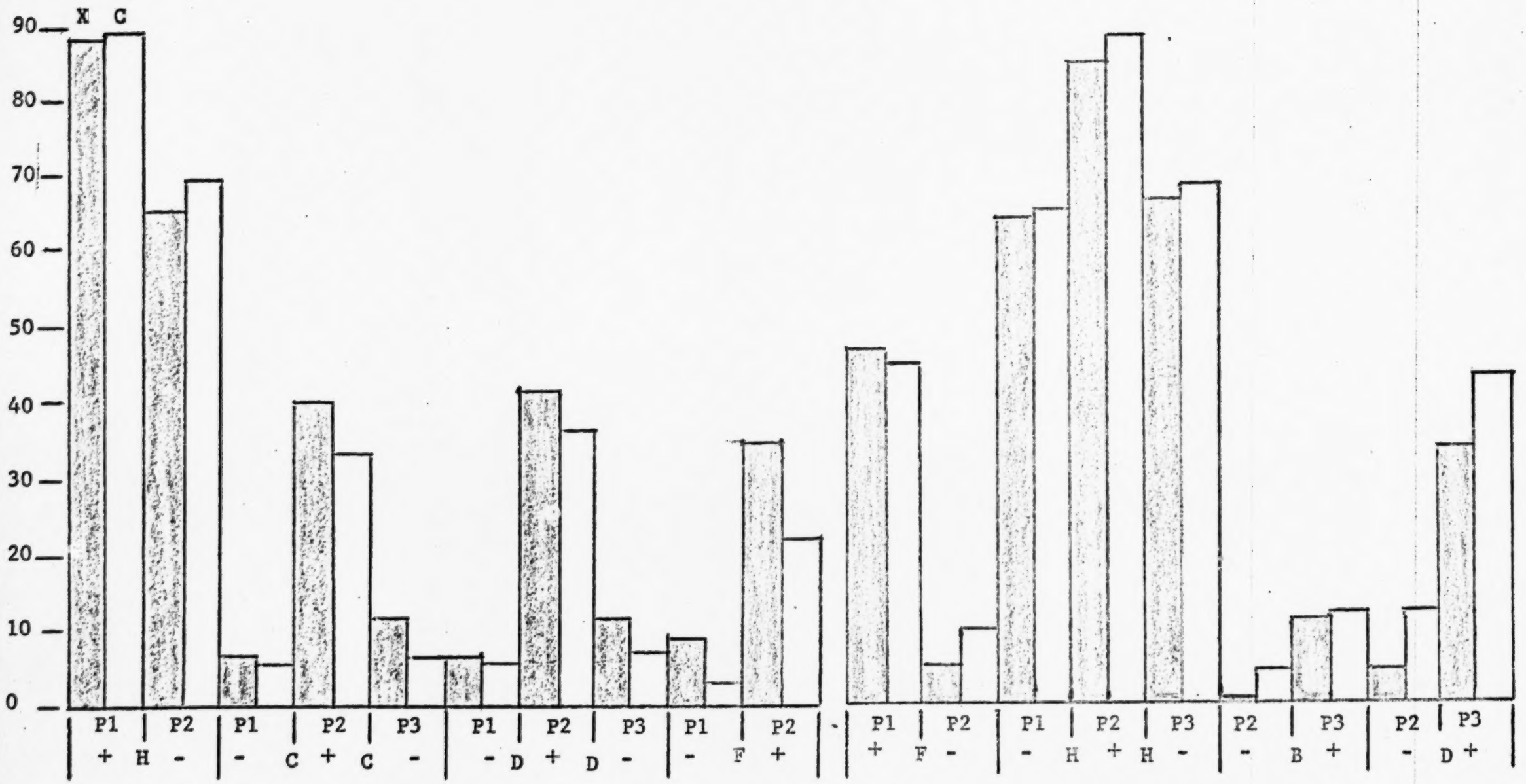
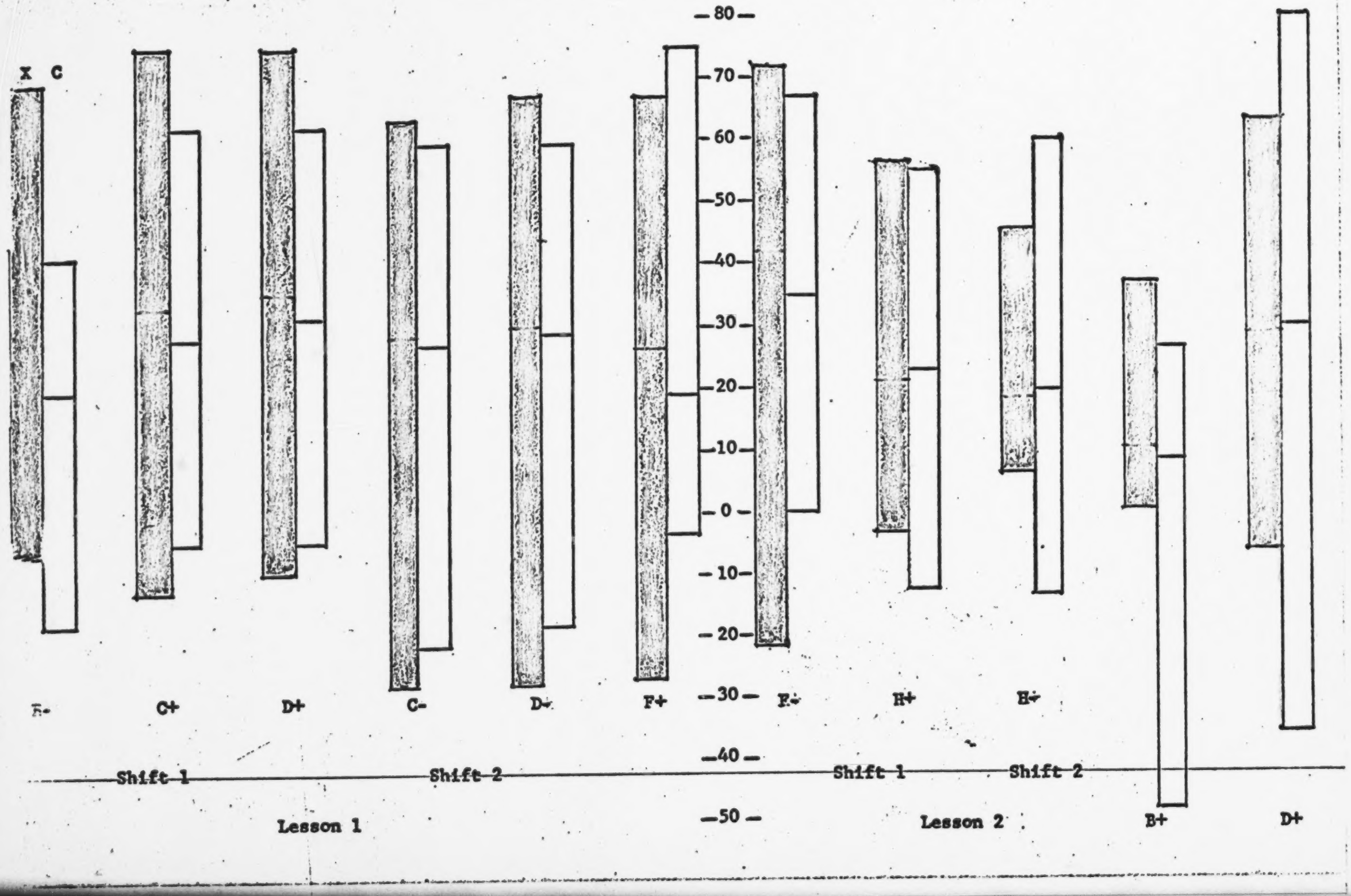


Figure 6

Percentage Index Difference(s) Means and Range Distributions
for Experimental and Control Groups



indices in lesson one and lesson two, it can be seen that the differences in performance of controlled flexibility between the two groups in both lessons was not great.

In shifting out of the direct informational-authoritative procedural model (H), the experimental group decreased slightly (4%) from lesson one to lesson two in its ability to shift away from direct-authoritative behavior while the control group maintained the same controlled flexibility level. The control group demonstrated two percent more controlled flexibility shifting into the direct-authoritative model. None of these differences were statistically significant.

As each subject attempted to shift out of the direct-authoritative environment in phase one of lesson one he was to radiate a reflective-creative expressive model (C) in phase two. The experimental group demonstrated its ability to control its flexibility by shifting into the creative expressive environment five percent more on the average than did the control group. Both groups indicated approximately the same ability to shift out of this environment. Neither of these differences was statistically significant.

In flexing their teaching styles between phases two and three of lesson two the subjects were to leave the direct-authoritative model and create an inductive thinking environment (B). Figure 6 shows the difficulty both groups encountered in attempting to initiate this type of classroom atmosphere. Although neither group demonstrated much verbal ability to develop this reflective environment, the experimental group's shift was two percent more on the average and its standard deviation was

five less than that of the control group.

Both groups were able to shift into and out of the indirect informational style (D) with a comparative high degree of controlled flexibility (29 to 35 percent). Although the overall percentage index mean difference for flexing into this environment for both groups decreased between lesson one and lesson two, this could be because the type of indirect model varied. Both groups demonstrated more ability to radiate a creative expressive environment in lesson one than the inductive thinking environment required in lesson two. This is further substantiated through inspection of the relatively close relationships between the percentage indices C and D means in lesson one as contrasted with the much wider spread between percentage indices B and D means in lesson two. The fact that the experimental group showed slightly more controlled flexibility, although not statistically significant, in shifting into (and out of) the specific reflective models indicates that further research using Instructional Flexibility Training with indirect models should be conducted. The comparative difference in ability of both groups to shift into the inductive thinking model as contrasted with the creative expressive environment supports Brown's observation that indirectness in teaching style can and should be broken down and analyzed in more specific terms.[19/]

In both lessons the experimental group demonstrated more controlled flexibility, though not statistically significant, in shifting into and out of the cooperative procedural environment (F). Figure 6 indicates that the percentage index F mean difference in lesson one and two was eight and seven percent respectively. Both groups demonstrated a higher degree

of controlled flexibility in shifting out of this environment than into it. This could be because the requirement for flexing out of this style occurred in lesson two, showing growth by both groups in controlled flexibility. A more likely explanation is that the cooperative procedural model was required in phase one of lesson two, and the subjects in both groups found it easier to shift out of this style into a direct-authoritative role than flexing into the cooperative procedural environment required in lesson one. The high percentages of direct-authoritative verbal behavior (H) in each phase shown in Figure 5 support this latter explanation.

The Kruskal-Wallis One Way Analysis of Variance by Ranks Test was used to determine if the controlled flexibility demonstrated by the experimental group was significantly greater than that manifested by the control group. Table III shows the comparatively low value of the Kruskal-Wallis Statistic H for percentage index H, indicating that the differences in controlled flexibility between the two groups shifting into and out of the direct informational-authoritative procedural model do not appraoch statistical significance.

Figure 6 and Table III similarly indicate few, and no statistically significant, differences between the two groups flexing into and out of the indirect-informational model (D) and the reflective-creative expressive environment (C), and into the reflective-inductive thinking model (B).

The H statistic in Table III indicates no significant difference between the groups in either lesson for the cooperative procedural model (F). The increase of the H statistic from .02 in lesson one to .74 in lesson two is the result of the differing numbers of subjects in each

TABLE III

VALUES OF KRUSKAL-WALLIS STATISTIC H FOR SELECTED INDICES BY LESSON AND SHIFT

Lesson, Shift and Index	H-Values	Sample Size Exp.	Cont.
Lesson 1			
Shift 1			
Index H	1.96	27	25
C	.66	27	25
D	.16	27	25
Shift 2			
Index C	.28	28	19
D	.06	28	19
F	.02	28	19
Lesson 2			
Shift 1			
Index F	.74	25	26
H	1.36	25	26
Shift 2			
Index H	1.69	25	26
B	.11	25	26
D	.09	25	26

The value of chi square at the .05 level of significance and for observed value of df = 1 is 3.84.

group demonstrating ability to shift into or out of the cooperative procedural model in each lesson.

Because none of the percentage index differences reached statistical significance, the null hypothesis must be accepted; i.e. the controlled flexibility demonstrated by the experimental group was not significantly greater than that manifested by the control group.

There is enough evidence; however, to indicate that further research concerning the use of Instructional Flexibility Training should be conducted. The fact that the experimental group demonstrated more controlled flexibility on every reflective informational and cooperative procedural index, even though not statistically significant, has positive implications.

With reference to the second hypothesis the results of the Sentence Completion Test indicated that the conceptual levels of all subjects in both groups measured on the lower end of the concreteness-abstractness continuum. On a scale of 1 to 7 the range of fifty-four subjects' scores was 1.0 to 3.3 (experimental and control group means were 2.11 and 2.14 respectively), demonstrating that all subjects were considerably more concrete than abstract in their thought processes. This limitation did not allow for a true test of the hypothesis. To determine if any relationship did exist between the conceptual levels indicated and the degrees of controlled flexibility exercised in each percentage index by the subjects for each shift in each lesson, the product moment coefficient of correlation (Pearson r) was used. The results as shown in Table IV demonstrate that no statistically significant relationship existed between the subjects' conceptual levels and their abilities to control their flexibility of

Table IV

PRODUCT MOMENT COEFFICIENT OF CORRELATION (PEARSON r) OF CONCEPTUAL LEVEL OF FIFTY-FOUR SUBJECTS AND THEIR CONTROLLED FLEXIBILITY AS MEASURED BY SELECTED PERCENTAGE DIFFERENCE INDICES MEANS

Lesson and Shift	Percentage Index	r
Lesson 1	C	-.1945
Shift 1	D	-.1679
	H	.0537
Lesson 2	C	.1035
Shift 2	D	.0693
	F	.0700
Lesson 2	F	.1420
Shift 1	H	-.0479
Lesson 2	B	-.0434
Shift 2	D	.0026
	H	.1268

teaching styles on any of the percentage indices. Therefore, based on the sample of this study, the null hypothesis must be accepted. However, because the sample did not provide the range of conceptual levels necessary to test the hypothesis adequately, further investigation using a more representative sample should be conducted. If the sampling used in this study, however, is representative of student teachers in training for the teaching profession, and there is reason to believe that it is,[20] then efforts will need to be made to recruit prospective teachers who place higher on the abstractness scale.

Figures 4 and 5 show a preponderance of direct informational-authoritative procedural verbal behavior on the part of both groups. These data support the preferred (initial) teaching styles of the subjects as measured in the initial teaching lessons.

These findings, although not conclusive because of the lack of comparison to data produced by subjects with higher conceptual levels, tend to support the earlier research of Hunt and Joyce,[21] i.e. student teachers with lower conceptual levels exhibit more directive behavior.

Figure 5 indicates that both groups on the whole were able to manifest the three models prescribed in each lesson except for the reflective-inductive thinking model in lesson two. The subjects' abilities to master prescribed teaching models bears out the research of Joyce and Hodges,[22] who, utilizing direct intervention, determined that teacher trainees could adapt their teaching styles to the models they were given. Both groups were able to radiate a reflective-creative expressive environment in lesson one and improve upon the cooperative procedural model from

lesson one to lesson two in addition to the direct-authoritative environments. These two strategies were included to a small degree in the initial teaching styles exhibited by both groups. The reflective-inductive thinking model was not a part of the preferred style of either group. Both groups were able to radiate this type of environment only minimumly. Further research will be necessary to determine if this comparative inability to manifest the reflective-inductive thinking environment could be attributed to the fact that it was not included in the subjects' preferred styles, not enough practice was provided, or that it requires a greater degree of abstract thinking than do the other models. The results do imply, however, that performance of the model can be learned.

Summary and Implications

Because all subjects were found to have comparatively low conceptual levels, falling on the concreteness side of the concreteness-abstractness spectrum, further research will be necessary to determine if any significant relationship exists between a learner's conceptual level and his ability to control his flexibility of teaching style.

Both the experimental and control groups were able to consciously radiate the prescribed environments (although each group encountered difficulty in fostering inductive thinking) thus demonstrating that these behaviors could be included in their repertoire of teaching maneuvers. Both groups predominantly exhibited direct-authoritative verbal behavior and experienced some difficulty in flexing out of this model. They manifested more controlled flexibility in shifting into and out

of the indirect and cooperative models. This could indicate that the made conscious effort to shift into and out of the indirect and cooperative models because they were not as comfortable in those roles. These results appear to be natural outgrowths of the subjects' preferred teaching styles which were more direct than indirect. More research will be needed using subjects having higher conceptual levels to determine if the above behaviors are primarily due to the comparatively concrete level of these subjects.

Although the differences were not statistically significant, the fact that the experimental group exercised more controlled flexibility than the control group shifting into and out of the reflective and cooperative environments, and because the experimental group increased more in supportiveness from the initial teaching style base, would imply that further research using IFT should be undertaken. IFT would appear to be useful in helping prospective teachers to add indirect teaching strategies to their repertoire. The preliminary indications that IFT may have promise in aiding prospective teachers who function at a low degree of integrative complexity to consciously attempt to radiate more abstract environments, such as the inductive thinking model, should be investigated further. It may be that IFT will be most effective in awakening and challenging the large numbers of more concrete functioning teacher trainees to attempt and learn the more abstract teaching strategies which are not included in the trainees' preferred teaching styles.

Footnotes

1. Bruce R. Joyce and Richard E. Hodges, "Instructional Flexibility Training," The Journal of Teacher Education, Vol. XVII, No. 4 (Winter 1966), p. 409-16.

2. O. J. Harvey, David E. Hunt, and Harold M. Schroder, Conceptual Systems and Personality Organization, (New York: John Wiley and Sons, Inc., 1961).

3. Ibid., p. 1

4. Harold M. Schroder, Michael J. Driver, and Siegfried Streufert, Human Information Processing, (New York: Holt, Rinehart and Winston, Inc.), p. 4.

5. Ibid.

6. Harvey, Hunt and Schroder, op. cit., pp. 1-2.

7. David E. Hunt, "A Conceptual Systems Change Model and Its Application to Education," Paper presented at Office of Naval Research Conference, Boulder, Colorado, March 19-21, 1964

8. David E. Hunt, "A Model for Analyzing the Training of Training Agents," Merrill Palmer Quarterly of Behavior and Development, Vol. XII, No. 2 (April, 1966) pp. 137-156.

9. Ibid., pp. 138-39

10. Formerly called the Conceptual Systems Manual, it may be found in Appendix A of Bruce R. Joyce and Benjamin Harootunian, The Structure of Teaching (Chicago: Science Research Associates, Inc., 1967).

11. Bruch R. Joyce and Richard E. Hodges, "The Use, for Research in Teacher Education, of Developmental Studies of the Teaching Styles of Elementary Teacher Education Students," Paper presented at AERA Annual Meeting, Chicago, 1966.

12. David E. Hunt, "A Model for Analyzing the Training of Training Agents," op. cit., pp. 153-54.

13. Bruce R. Joyce, "Flexibility in Teaching Behavior," Classroom Interaction Newsletter, Vol. II, No. 2 (May, 1967) p. 7.

14. David E. Hunt, "The Communication Task," Unpublished Manuscript, Syracuse University, 1965.

Footnotes - Contd.

15. David E. Hunt and Bruce R. Joyce, "Teacher Trainee Personality and Initial Teaching Style," American Educational Research Journal, Vol. IV, No. 3 (May, 1967), p. 257.

16. Bruce R. Joyce and Richard E. Hodges, "The Use for Research In Teacher Education, of Developmental Studies of the Teaching Styles of Elementary Teacher Education Students," op. cit., p. 10.

17. Schroder, Driver, and Streufert, op. cit., pp. 185-198.

18. Bruce R. Joyce and Benjamin Harootunian, The Structure of Teaching, (Chicago: Science Research Associates, Inc., 1967), Appendix A, pp. 228-46.

19. Clark C. Brown, "The Relationship of Initial Teaching Styles and Selected Variables in Student Teaching" (unpublished Ed. D. dissertation, Teachers College, Columbia University, 1967), pp. pp. 69-70.

20. See O.J. Harvey, "Fostering Openness and Adaptability through Education" (unpublished manuscript, University of Colorado, 1967), p. 15.

21. David E. Hunt and Bruce R. Joyce, "Teacher Trainee Personality and Initial Teaching Style," American Educational Research Journal, Vol. IV, No. 3 (May 1967), p. 257.

22. Bruce R. Joyce and Richard E. Hodges, "The Use, for Research in Teacher Education, of Developmental Studies of the Teaching Styles of Elementary Teacher Education Students," Paper presented at American Educational Research Association Annual Meeting, Chicago, 1966.

APPENDIX A

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APPENDIX B

INDIVIDUAL SUBJECT VERBAL TEACHING STYLE SHIFT SCORES AS DETERMINED BY CLINICAL JUDGMENT FOR SHIFTS BETWEEN PHASES OF INITIAL AND FINAL CONTROLLED FLEXIBILITY LESSONS

Experimental Group					Control Group				
Subject	Initial Lesson Shift 1	Initial Lesson Shift 2	Final Lesson Shift 1	Final Lesson Shift 2	Subject	Initial Lesson Shift 1	Initial Lesson Shift 2	Final Lesson Shift 1	Final Lesson Shift 2
1	4	4	4	4	31	3	2	4	3
3	3	3	4	5	32	4	1	2	2
4	4	4	5	5	33	4	1	3	4
6	5	5	4	4	34	4	3	3	3
7	5	4	4	4	35	5	4	5	4
8	4	4	4	4	36	2	3	3	3
9	4	3	2	2	37	3	2	5	5
10	4	3	1	1	38	1	1	3	3
11	3	2	3	2	39	4	1	4	4
12	3	4	5	3	40	4	3	4	4
13	4	4	4	3	42	3	4	4	3
14	4	4	5	3	43	2	2	4	3
15	4	4	5	3	44	2	3	4	4
16	4	4	2	1	45	4	1	4	4
17	4	4	5	3	46	4	1	4	5
18	3	5	3	4	47	5	3	5	4
19	5	4	1	1	48	4	1	4	4
20	3	2	2	2	49	4	4	3	3
21	3	4	2	2	51	3	4	4	4
22	3	3	4	4	52	4	5	3	4
23	4	4	4	4	53	4	4	4	4
24	4	4	4	4	54	4	4	5	4
25	3	5	4	4	55	3	4	3	3
26	4	4	2	2	56	4	4	4	4
27	1	4	2	2	57	4	4	4	4
28	4	4	4	4	58	5	3	2	4
29	3	4	4	3					
30	4	4	4	2					